

# DATA VALIDATION MONUMENT VALLEY, AZ

December 2003  
Water Sampling

Prepared by the  
U.S. Department of Energy  
Grand Junction, Colorado



Work Performed under DOE Contract No. DE-AC01-02GJ79491 for the U.S. Department of Energy, Grand Junction, Colorado.

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## **DISCLAIMER**

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**MONUMENT VALLEY, ARIZONA**  
Sampled December 2003

**DATA PACKAGE CONTENTS**

This data package includes the following information:

<u>Item No.</u>	<u>Description of Contents</u>
1.	<b>Site Lead Summary.</b>
2.	<b>Data Package Assessment</b> , which includes the following: <ul style="list-style-type: none"><li>a. Field activities verification checklist.</li><li>b. Confirmation that chain-of-custody was maintained.</li><li>c. Confirmation that holding time requirements were met.</li><li>d. Evaluation of the adequacy of the QC sample results.</li></ul>
3.	<b>Data Assessment Summary</b> , which describes problems identified in the data validation process and summarizes the validator's findings.
4.	<b>Minimum / Maximum Table</b> , is generated by the database system. This table compares the new data set with historical minimums and maximums and lists the data on the table if they exceed the historical minimums and maximums. The data are further scrutinized and listed on the Anomalous Data Review Checksheet if they are 50 percent greater than or 50 percent less than the historical maximums and minimums, respectively.
5.	<b>UMTRA Database Printouts</b> <ul style="list-style-type: none"><li>a. General Water Quality Data (included on disk).</li><li>b. Equipment Blank Data (included on disk).</li><li>c. Time Versus Concentration Graphs.</li><li>d. Water Level Data.</li></ul>
6.	<b>Sampling and Analysis Work Order and Trip Report.</b>
7.	<b>Sampling Location Map.</b>

## Site Lead Summary

**Site:** Monument Valley, Arizona

**Sampling Period:** December 15 – 18, 2003

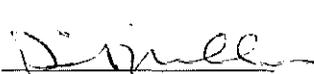
### SUMMARY CRITERIA

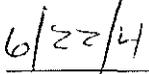
For unknown reasons, the uranium concentration in well 662 was measured at an all time high. This anomaly will continue to be monitored closely in future sampling events. Aside from the one uranium anomaly, there is no other indication of unexpected contaminated ground water movement at the Monument Valley site. Time versus concentration graphs for nitrate, sulfate, and uranium from selected wells are provided in this report. Wells with sample concentrations that exceed ground water standards are listed in Table 1.

*Table 1. Monument Valley Wells with Samples that Exceeded Standards in December 2003.*

ANALYTE	STANDARD <sup>1</sup>	WELLS EXCEEDING STANDARDS (CONCENTRATION <sup>1</sup> )
Nitrate	44.27	0606 (878), 0655 (469), 0656 (117), 0669 (53.4), 0761 (105), 0762 (224), 0764 (198), 0765 (598), 0770 (108), 0771 (675)
Uranium	0.044	0619 (0.059), 0619 (0.059), 0662 (0.220), 0774 (0.0611)

<sup>1</sup>Units are in mg/L.

  
David Miller  
Site Lead

  
Date

# **DATA ASSESSMENT**

## Water Sampling Field Activities Verification Checklist

Project	Monument Valley, Az	Date(s) of Water Sampling	12/15 – 12/17/03
Date(s) of Verification	01/09/04	Name of Verifier	Jeff Price

	Response (Yes, No, NA)	Comments
1. Is the SAP the primary document directing field procedures? List other documents, SOP's, instructions.	Yes	Work Request.
2. Were the sampling locations specified in the planning documents sampled?	Yes	
3. Was a pre-trip calibration conducted as specified in the above named documents?	Yes	
4. Was an operational check of the field equipment conducted twice daily? Did the operational checks meet criteria?	Yes	
	Yes	
5. Were the number and types (alkalinity, temperature, Ec, pH, turbidity, DO, ORP) of field measurements taken as specified?	Yes	
6. Was the Category of the well documented?	Yes	
7. Were the following conditions met when purging a Category I well: Was one pump/tubing volume purged prior to sampling?	Yes	
Did the water level stabilize prior to sampling?	Yes	
Did pH, specific conductance, and turbidity measurements stabilize prior to sampling?	Yes	
Was the flow rate less than 500 mL/min?	Yes	
If a portable pump was used, was there a 4 hour delay between pump installation and sampling?	NA	

## Water Sampling Field Activities Verification Checklist (continued)

8. Were the following conditions met when purging a Category II well:

Was the flow rate less than 500 mL/min?

Yes

Was one pump/tubing volume removed prior to sampling?

Yes

9. Were duplicates taken at a frequency of one per 20 samples?

Yes

10. Were equipment blanks taken at a frequency of one per 20 samples that were collected with nondedicated equipment?

Yes

11. Were trip blanks prepared and included with each shipment of VOC samples?

NA

12. Were QC samples assigned a fictitious site identification number?

Yes

Was the true identity of the samples recorded on the Quality Assurance Sample Log?

Yes

13. Were samples collected in the containers specified?

Yes

14. Were samples filtered and preserved as specified?

Yes

15. Were the number and types of samples collected as specified?

Yes

16. Were chain of custody records completed and was sample custody maintained?

Yes

17. Are field data sheets signed and dated by both team members?

Yes

18. Was all other pertinent information documented on the field data sheets?

Yes

19. Was the presence or absence of ice in the cooler documented at every sample location?

Yes

20. Were water levels measured at the locations specified in the planning documents?

Yes

### Data Package Assessment

Requisition Numbers: 18800      Site: Monument Valley, Az.    Laboratory: GJO      Analysis Dates: 12/22 – 12/24/03  
 Reviewer: Jeff Price      *J. E. Price*      January 6, 2004  
Name (print)      Signature      Date

	ICP-MS	ICP-AES	FAA	NaBH <sub>4</sub>	AS	LSc	PC	IC	Gravimetric	Colorimetric	Other
Chain of Custody	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>
Holding Time	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>
Calib. Verification (For As, internal tracer)	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>
Prep. Blanks (Only if digestion)	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
Int/Cont Cal. Blanks	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>
ICP Serial Dilution	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
ICS (ICP only)	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
Lab Control Sample	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>
Duplicates	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>
Postdigest. Spks. (Only if MS fails)	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>
Matrix Spks.	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>
Overall Assess.	<u>OK</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>	<u>OK</u>	<u>NA</u>

Data Requiring Flags:

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**MONUMENT VALLEY, AZ  
DECEMBER 2003 SAMPLING EVENT  
DATA ASSESSMENT SUMMARY**

The DOE-GJO Analytical Laboratory analyzed samples and reported results for this sampling event under requisition number 18800.

**METALS / MAJOR CATIONS ANALYSIS**

Uranium was analyzed by inductively coupled plasma-mass spectrometry (ICP-MS).

**INORGANIC ANALYSIS**

Nitrate and sulfate were determined by ion chromatography (IC). Ammonium was determined by spectrophotometry (colorimetry).

**FIELD ANALYSIS/ACTIVITIES**

Results from all sampled wells were qualified with an "F" flag in the database indicating these wells were purged and sampled using the low-flow method. Because a constant water level could not be maintained during sampling, results from well 0764 were qualified with a "Q" flag.

An equipment blank was collected and analyzed for the same constituents as the Monument Valley environmental samples. There were no site related contaminants detected in the equipment blank in concentrations above the contract-required detection limit (CRDL); therefore, equipment blank results are considered acceptable.

A field duplicate was collected from well 0619. There are no established regulatory criteria for the evaluation of field duplicate samples; therefore, EPA guidance for *laboratory* duplicates (which is conservative for field duplicates) was used to assess the precision of the field duplicates. Duplicate sample results met the laboratory duplicate criteria (20 relative percent difference) and are considered acceptable.

**MINIMUM / MAXIMUM TABLE**

Values listed in the MIN / MAX table were considered valid if: (1) identified low concentrations were the result of low detection limits; or (2) the concentration detected was within 50 percent historical minimum or maximum values. Results that did not meet these criteria are listed on the Anomalous Data Review Checksheet.

## SUMMARY

All analytical quality control criteria were met except as qualified on the General Water Quality Data by Parameter and equipment blank database printouts. The meaning of data qualifiers is defined on the UMTRA data base printouts or defined in the USEPA Contract Laboratory Program Statement of Work for Inorganic Analysis, Multi-Media Multi-Concentration, Document Number ILMO2.0, 1991. All data in this package are considered validated and may be treated as final results. An electronic copy of the analytical data with the qualifiers incorporated is included with this data validation package.

J. E. Price  
Jeff Price  
Data Validation Lead

2/3/04  
Date

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**MINIMUM / MAXIMUM  
TABLE**

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SAMPLING DATA VALIDATION MINIMUMS AND MAXIMUMS REPORT

LAB REQUISITION(S): 18800

REPORT DATE: 01/30/04 08:26:10: AM

SITE CODE	LOCATION CODE	SAMPLE DATE	ANALYTE	RESULT	QUALIFIER S	MAXIMUM	MAXIMUM LAB DATA	MINIMUM	MINIMUM LAB DATA	N	N BELOW
MON01	0606	12/16/2003	Ammonia Total as NH4	169	F	400		170	L	36	0
MON01	0606	12/16/2003	Sulfate	443	F	1650		447	F	40	0
MON01	0606	12/16/2003	Turbidity	0.25	F	1000	> L	2.62	F	10	0
MON01	0655	12/17/2003	Uranium	0.0148	F	0.0343	F	0.019		31	0
MON01	0656	12/17/2003	Alkalinity, Total (As CaCO3)	216	F	312		227		20	0
MON01	0656	12/17/2003	Nitrate as NO3	117	F	460	F	133	F	14	0
MON01	0656	12/17/2003	Specific Conductance	1198	F	2100	F	1270	F	15	0
MON01	0656	12/17/2003	Turbidity	0.26	F	469		0.82	F	9	0
MON01	0656	12/17/2003	Uranium	0.006	F	0.0117		0.0067		12	0
MON01	0662	12/16/2003	Uranium	0.22	F	0.0356		0.013		17	0
MON01	0669	12/17/2003	Ammonia Total as NH4	3.88	F	1.16	L	0.1	U J	15	7
MON01	0669	12/17/2003	Specific Conductance	675	F	950		685	F	19	0
MON01	0669	12/17/2003	Sulfate	159	F	460		166	F	19	0
MON01	0669	12/17/2003	Turbidity	0.18	F	19.3	L	0.39		8	0
MON01	0669	12/17/2003	Uranium	0.0076	F	0.0155		0.009	F	17	0
MON01	0760	12/16/2003	Alkalinity, Total (As CaCO3)	153	F	185		156	F	12	0
MON01	0760	12/16/2003	Ammonia Total as NH4	0.185	F	0.151		0.0915	B	4	0
MON01	0761	12/16/2003	Nitrate as NO3	105	F	94.9	F	73.7		7	0
MON01	0762	12/16/2003	Nitrate as NO3	224	F	194	F	63.7		8	0
MON01	0762	12/16/2003	Specific Conductance	3061	F	2890		2010		8	0
MON01	0762	12/16/2003	Sulfate	1430	F	1340	F	761		8	0
MON01	0764	12/16/2003	Nitrate as NO3	198	FQ	163	F	86.1		8	0
MON01	0764	12/16/2003	Turbidity	6.06	FQ	1000	> L	8.14	F	8	0
MON01	0767	12/17/2003	Sulfate	33.2	F	31.4	F	26.9		9	0
MON01	0767	12/17/2003	Turbidity	5.55	F	1.1		0.21		8	0
MON01	0768	12/17/2003	Specific Conductance	549	F	2210		658	F	8	0

SAMPLING DATA VALIDATION MINIMUMS AND MAXIMUMS REPORT

LAB REQUISITION(S): 18800

REPORT DATE: 01/30/04 08:26:11: AM

SITE CODE	LOCATION CODE	SAMPLE DATE	ANALYTE	RESULT	QUALIFIER S	MAXIMUM	MAXIMUM LAB DATA	MINIMUM	MINIMUM LAB DATA	N	N BELOW
MON01	0768	12/17/2003	Sulfate	131	F	862		163	F	9	0
MON01	0770	12/17/2003	Ammonia Total as NH4	46.9	F	67.2		50.3		6	0
MON01	0770	12/17/2003	Nitrate as NO3	108	F	183		122	F	8	0
MON01	0770	12/17/2003	Sulfate	263	F	389		265	F	8	0
MON01	0771	12/17/2003	Specific Conductance	4456	F	6740	L	4935	F	7	0
MON01	0771	12/17/2003	Sulfate	2230	F	3710		2360	F	8	0
MON01	0772	12/16/2003	Ammonia Total as NH4	4.32	F	17.7		7.61		9	0
MON01	0772	12/16/2003	Specific Conductance	822	F	1422		826	F	8	0
MON01	0772	12/16/2003	Turbidity	2.43	F	47.4		7.18		8	0
MON01	0774	12/15/2003	Turbidity	1.46	F	1000	> L	2.72		8	0
MON01	0774	12/15/2003	Uranium	0.0611	F	0.0726		0.0641	F	8	0

SAMPLING DATA VALIDATION MINIMUMS AND MAXIMUMS REPORT

LAB REQUISITION(S): 18800

REPORT DATE: 01/30/04 08:26:11: AM

SITE CODE	LOCATION CODE	SAMPLE DATE	ANALYTE	RESULT	QUALIFIER S	MAXIMUM LAB DATA	MINIMUM LAB DATA	MINIMUM LAB DATA	N	N BELOW
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SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.
- J Estimated

DATA QUALIFIERS:

- |  |  |   |
|--|--|---|
| J Estimated value.                                   | F Low flow sampling method used.               | G Possible grout contamination, pH > 9. |
| L Less than 3 bore volumes purged prior to sampling. | R Unusable result.                             | X Location is undefined.                |
| U Parameter analyzed for but was not detected.       | Q Qualitative result due to sampling technique |   |

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# **DATA REVIEW CHECKSHEET**

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# **WATER QUALITY DATA**

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GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 1/30/2004 9:43 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Alkalinity, Total (As CaCO3)	mg/L	0604	WL	12/16/2003	0001	13.00 - 28.00	176	F	#	-	-	
	mg/L	0606	WL	12/16/2003	0001	32.00 - 42.00	222	F	#	-	-	
	mg/L	0619	WL	12/15/2003	0001	103.90 - 153.90	148	F	#	-	-	
	mg/L	0655	WL	12/17/2003	0001	38.00 - 58.00	239	F	#	-	-	
	mg/L	0656	WL	12/17/2003	0001	38.00 - 58.00	216	F	#	-	-	
	mg/L	0662	WL	12/16/2003	0001	37.50 - 67.50	199	F	#	-	-	
	mg/L	0669	WL	12/17/2003	0001	34.00 - 54.00	173	F	#	-	-	
	mg/L	0760	WL	12/16/2003	0001	55.00 - 75.00	153	F	#	-	-	
	mg/L	0761	WL	12/16/2003	0001	39.00 - 49.00	167	F	#	-	-	
	mg/L	0762	WL	12/16/2003	0001	29.00 - 49.00	214	F	#	-	-	
	mg/L	0764	WL	12/16/2003	0001	47.00 - 52.00	217	FQ	#	-	-	
	mg/L	0765	WL	12/17/2003	0001	58.60 - 88.70	248	F	#	-	-	
	mg/L	0767	WL	12/17/2003	0001	43.50 - 63.50	157	F	#	-	-	
	mg/L	0768	WL	12/17/2003	0001	24.40 - 44.40	168	F	#	-	-	
	mg/L	0770	WL	12/17/2003	0001	54.90 - 64.90	222	F	#	-	-	
	mg/L	0771	WL	12/17/2003	0001	57.40 - 77.40	339	F	#	-	-	
	mg/L	0772	WL	12/16/2003	0001	7.40 - 27.40	238	F	#	-	-	
mg/L	0774	WL	12/15/2003	0001	45.00 - 55.00	151	F	#	-	-		
Ammonia Total as NH4	mg/L	0604	WL	12/16/2003	0001	13.00 - 28.00	0.0584	B	F	#	0.0054	-
	mg/L	0606	WL	12/16/2003	0001	32.00 - 42.00	169.000		F	#	0.0054	-
	mg/L	0619	WL	12/15/2003	0001	103.90 - 153.90	0.00540	U	F	#	0.0054	-
	mg/L	0619	WL	12/15/2003	0002	103.90 - 153.90	0.00540	U	F	#	0.0054	-
	mg/L	0655	WL	12/17/2003	0001	38.00 - 58.00	101.000		F	#	0.0054	-
	mg/L	0656	WL	12/17/2003	0001	38.00 - 58.00	70.500		F	#	0.0054	-
	mg/L	0662	WL	12/16/2003	0001	37.50 - 67.50	0.00540	U	F	#	0.0054	-
	mg/L	0669	WL	12/17/2003	0001	34.00 - 54.00	3.880		F	#	0.0054	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 1/30/2004 9:20 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Ammonia Total as NH4	mg/L	0760	WL	12/16/2003	0001	55.00 - 75.00	0.185	F #	0.0054	-
	mg/L	0761	WL	12/16/2003	0001	39.00 - 49.00	0.00540	U F #	0.0054	-
	mg/L	0762	WL	12/16/2003	0001	29.00 - 49.00	0.00540	U F #	0.0054	-
	mg/L	0764	WL	12/16/2003	0001	47.00 - 52.00	0.0350	B FQ #	0.0054	-
	mg/L	0765	WL	12/17/2003	0001	58.60 - 88.70	165.000	F #	0.0054	-
	mg/L	0767	WL	12/17/2003	0001	43.50 - 63.50	0.179	F #	0.0054	-
	mg/L	0768	WL	12/17/2003	0001	24.40 - 44.40	0.766	F #	0.0054	-
	mg/L	0770	WL	12/17/2003	0001	54.90 - 64.90	46.900	F #	0.0054	-
	mg/L	0771	WL	12/17/2003	0001	57.40 - 77.40	283.000	F #	0.0054	-
	mg/L	0772	WL	12/16/2003	0001	7.40 - 27.40	4.320	F #	0.0054	-
	mg/L	0774	WL	12/15/2003	0001	45.00 - 55.00	0.00680	B F #	0.0054	-
	Nitrate as NO3	mg/L	0604	WL	12/16/2003	0001	13.00 - 28.00	0.305	B F #	0.0191
mg/L		0606	WL	12/16/2003	0001	32.00 - 42.00	878.000	F #	0.191	-
mg/L		0619	WL	12/15/2003	0001	103.90 - 153.90	12.000	F #	0.0191	-
mg/L		0619	WL	12/15/2003	0002	103.90 - 153.90	11.800	F #	0.0191	-
mg/L		0655	WL	12/17/2003	0001	38.00 - 58.00	469.000	F #	0.191	-
mg/L		0656	WL	12/17/2003	0001	38.00 - 58.00	117.000	F #	0.191	-
mg/L		0662	WL	12/16/2003	0001	37.50 - 67.50	28.000	F #	0.0191	-
mg/L		0669	WL	12/17/2003	0001	34.00 - 54.00	53.400	F #	0.0191	-
mg/L		0760	WL	12/16/2003	0001	55.00 - 75.00	0.0191	U F #	0.0191	-
mg/L		0761	WL	12/16/2003	0001	39.00 - 49.00	105.000	F #	0.191	-
mg/L		0762	WL	12/16/2003	0001	29.00 - 49.00	224.000	F #	0.191	-
mg/L		0764	WL	12/16/2003	0001	47.00 - 52.00	198.000	FQ #	0.191	-
mg/L		0765	WL	12/17/2003	0001	58.60 - 88.70	598.000	F #	0.191	-
mg/L		0767	WL	12/17/2003	0001	43.50 - 63.50	0.0191	U F #	0.0191	-
mg/L		0768	WL	12/17/2003	0001	24.40 - 44.40	0.0191	U F #	0.0191	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 1/30/2004 9:20 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Nitrate as NO3	mg/L	0770	WL	12/17/2003	0001	54.90 - 64.90	108.000	F	#	0.191	-	
	mg/L	0771	WL	12/17/2003	0001	57.40 - 77.40	675.000	F	#	0.191	-	
	mg/L	0772	WL	12/16/2003	0001	7.40 - 27.40	9.840	F	#	0.0191	-	
	mg/L	0774	WL	12/15/2003	0001	45.00 - 55.00	13.100	F	#	0.0191	-	
Oxidation Reduction Potent	mV	0604	WL	12/16/2003	N001	13.00 - 28.00	88	F	#	-	-	
	mV	0606	WL	12/16/2003	N001	32.00 - 42.00	151	F	#	-	-	
	mV	0619	WL	12/15/2003	N001	103.90 - 153.90	214	F	#	-	-	
	mV	0655	WL	12/17/2003	N001	38.00 - 58.00	167	F	#	-	-	
	mV	0656	WL	12/17/2003	N001	38.00 - 58.00	19	F	#	-	-	
	mV	0662	WL	12/16/2003	N001	37.50 - 67.50	187	F	#	-	-	
	mV	0669	WL	12/17/2003	N001	34.00 - 54.00	142	F	#	-	-	
	mV	0760	WL	12/16/2003	N001	55.00 - 75.00	-92	F	#	-	-	
	mV	0761	WL	12/16/2003	N001	39.00 - 49.00	192	F	#	-	-	
	mV	0762	WL	12/16/2003	N001	29.00 - 49.00	154	F	#	-	-	
	mV	0764	WL	12/16/2003	N001	47.00 - 52.00	95	FQ	#	-	-	
	mV	0765	WL	12/17/2003	N001	58.60 - 88.70	218	F	#	-	-	
	mV	0767	WL	12/17/2003	N001	43.50 - 63.50	-129	F	#	-	-	
	mV	0768	WL	12/17/2003	N001	24.40 - 44.40	-192	F	#	-	-	
	mV	0770	WL	12/17/2003	N001	54.90 - 64.90	-12	F	#	-	-	
	mV	0771	WL	12/17/2003	N001	57.40 - 77.40	202	F	#	-	-	
mV	0772	WL	12/16/2003	N001	7.40 - 27.40	79	F	#	-	-		
mV	0774	WL	12/15/2003	N001	45.00 - 55.00	225	F	#	-	-		
pH	s.u.	0604	WL	12/16/2003	N001	13.00 - 28.00	8.32	F	#	-	-	
	s.u.	0606	WL	12/16/2003	N001	32.00 - 42.00	7.28	F	#	-	-	
	s.u.	0619	WL	12/15/2003	N001	103.90 - 153.90	7.68	F	#	-	-	
	s.u.	0655	WL	12/17/2003	N001	38.00 - 58.00	7.22	F	#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 1/30/2004 9:20 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
pH	s.u.	0656	WL	12/17/2003	N001	38.00 - 58.00	7.69	F	#	-	-	
	s.u.	0662	WL	12/16/2003	N001	37.50 - 67.50	7.4	F	#	-	-	
	s.u.	0669	WL	12/17/2003	N001	34.00 - 54.00	7.56	F	#	-	-	
	s.u.	0760	WL	12/16/2003	N001	55.00 - 75.00	8.23	F	#	-	-	
	s.u.	0761	WL	12/16/2003	N001	39.00 - 49.00	7.45	F	#	-	-	
	s.u.	0762	WL	12/16/2003	N001	29.00 - 49.00	7.56	F	#	-	-	
	s.u.	0764	WL	12/16/2003	N001	47.00 - 52.00	7.69	FQ	#	-	-	
	s.u.	0765	WL	12/17/2003	N001	58.60 - 88.70	7.34	F	#	-	-	
	s.u.	0767	WL	12/17/2003	N001	43.50 - 63.50	7.97	F	#	-	-	
	s.u.	0768	WL	12/17/2003	N001	24.40 - 44.40	8.16	F	#	-	-	
	s.u.	0770	WL	12/17/2003	N001	54.90 - 64.90	7.55	F	#	-	-	
	s.u.	0771	WL	12/17/2003	N001	57.40 - 77.40	7.25	F	#	-	-	
	s.u.	0772	WL	12/16/2003	N001	7.40 - 27.40	8	F	#	-	-	
	s.u.	0774	WL	12/15/2003	N001	45.00 - 55.00	7.59	F	#	-	-	
Specific Conductance	umhos/cm	0604	WL	12/16/2003	N001	13.00 - 28.00	598	F	#	-	-	
	umhos/cm	0606	WL	12/16/2003	N001	32.00 - 42.00	2762	F	#	-	-	
	umhos/cm	0619	WL	12/15/2003	N001	103.90 - 153.90	439	F	#	-	-	
	umhos/cm	0655	WL	12/17/2003	N001	38.00 - 58.00	3385	F	#	-	-	
	umhos/cm	0656	WL	12/17/2003	N001	38.00 - 58.00	1198	F	#	-	-	
	umhos/cm	0662	WL	12/16/2003	N001	37.50 - 67.50	916	F	#	-	-	
	umhos/cm	0669	WL	12/17/2003	N001	34.00 - 54.00	675	F	#	-	-	
	umhos/cm	0760	WL	12/16/2003	N001	55.00 - 75.00	513	F	#	-	-	
	umhos/cm	0761	WL	12/16/2003	N001	39.00 - 49.00	1349	F	#	-	-	
	umhos/cm	0762	WL	12/16/2003	N001	29.00 - 49.00	3061	F	#	-	-	
	umhos/cm	0764	WL	12/16/2003	N001	47.00 - 52.00	1330	FQ	#	-	-	
umhos/cm	0765	WL	12/17/2003	N001	58.60 - 88.70	2837	F	#	-	-		

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 1/30/2004 9:20 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Specific Conductance	umhos/cm	0767	WL	12/17/2003	N001	43.50 - 63.50	391	F	#	-	-	
	umhos/cm	0768	WL	12/17/2003	N001	24.40 - 44.40	549	F	#	-	-	
	umhos/cm	0770	WL	12/17/2003	N001	54.90 - 64.90	1164	F	#	-	-	
	umhos/cm	0771	WL	12/17/2003	N001	57.40 - 77.40	4456	F	#	-	-	
	umhos/cm	0772	WL	12/16/2003	N001	7.40 - 27.40	822	F	#	-	-	
	umhos/cm	0774	WL	12/15/2003	N001	45.00 - 55.00	442	F	#	-	-	
Sulfate	mg/L	0604	WL	12/16/2003	0001	13.00 - 28.00	107.000	F	#	0.153	-	
	mg/L	0606	WL	12/16/2003	0001	32.00 - 42.00	443.000	F	#	0.153	-	
	mg/L	0619	WL	12/15/2003	0001	103.90 - 153.90	60.500	F	#	0.0153	-	
	mg/L	0619	WL	12/15/2003	0002	103.90 - 153.90	61.400	F	#	0.0153	-	
	mg/L	0655	WL	12/17/2003	0001	38.00 - 58.00	1750.000	F	#	0.306	-	
	mg/L	0656	WL	12/17/2003	0001	38.00 - 58.00	243.000	F	#	0.153	-	
	mg/L	0662	WL	12/16/2003	0001	37.50 - 67.50	310.000	F	#	0.153	-	
	mg/L	0669	WL	12/17/2003	0001	34.00 - 54.00	159.000	F	#	0.153	-	
	mg/L	0760	WL	12/16/2003	0001	55.00 - 75.00	88.400	F	#	0.0153	-	
	mg/L	0761	WL	12/16/2003	0001	39.00 - 49.00	512.000	F	#	0.153	-	
	mg/L	0762	WL	12/16/2003	0001	29.00 - 49.00	1430.000	F	#	0.306	-	
	mg/L	0764	WL	12/16/2003	0001	47.00 - 52.00	381.000	FQ	#	0.153	-	
	mg/L	0765	WL	12/17/2003	0001	58.60 - 88.70	731.000	F	#	0.153	-	
	mg/L	0767	WL	12/17/2003	0001	43.50 - 63.50	33.200	F	#	0.0153	-	
	mg/L	0768	WL	12/17/2003	0001	24.40 - 44.40	131.000	F	#	0.153	-	
	mg/L	0770	WL	12/17/2003	0001	54.90 - 64.90	263.000	F	#	0.153	-	
	mg/L	0771	WL	12/17/2003	0001	57.40 - 77.40	2230.000	F	#	0.765	-	
	mg/L	0772	WL	12/16/2003	0001	7.40 - 27.40	157.000	F	#	0.153	-	
	mg/L	0774	WL	12/15/2003	0001	45.00 - 55.00	65.700	F	#	0.0153	-	
	Temperature	C	0604	WL	12/16/2003	N001	13.00 - 28.00	13	F	#	-	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 1/30/2004 9:20 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:			DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB	DATA	QA		
Temperature	C	0606	WL	12/16/2003	N001	32.00 - 42.00	13.92	F	#	-	-	
	C	0619	WL	12/15/2003	N001	103.90 - 153.90	14.54	F	#	-	-	
	C	0655	WL	12/17/2003	N001	38.00 - 58.00	15.28	F	#	-	-	
	C	0656	WL	12/17/2003	N001	38.00 - 58.00	15.67	F	#	-	-	
	C	0662	WL	12/16/2003	N001	37.50 - 67.50	15.42	F	#	-	-	
	C	0669	WL	12/17/2003	N001	34.00 - 54.00	14.67	F	#	-	-	
	C	0760	WL	12/16/2003	N001	55.00 - 75.00	14.11	F	#	-	-	
	C	0761	WL	12/16/2003	N001	39.00 - 49.00	14.92	F	#	-	-	
	C	0762	WL	12/16/2003	N001	29.00 - 49.00	15.58	F	#	-	-	
	C	0764	WL	12/16/2003	N001	47.00 - 52.00	14.12	FQ	#	-	-	
	C	0765	WL	12/17/2003	N001	58.60 - 88.70	15.27	F	#	-	-	
	C	0767	WL	12/17/2003	N001	43.50 - 63.50	14.87	F	#	-	-	
	C	0768	WL	12/17/2003	N001	24.40 - 44.40	14.83	F	#	-	-	
	C	0770	WL	12/17/2003	N001	54.90 - 64.90	15.74	F	#	-	-	
	C	0771	WL	12/17/2003	N001	57.40 - 77.40	14.32	F	#	-	-	
C	0772	WL	12/16/2003	N001	7.40 - 27.40	14.37	F	#	-	-		
C	0774	WL	12/15/2003	N001	45.00 - 55.00	13.6	F	#	-	-		
Turbidity	NTU	0604	WL	12/16/2003	N001	13.00 - 28.00	2.75	F	#	-	-	
	NTU	0606	WL	12/16/2003	N001	32.00 - 42.00	0.25	F	#	-	-	
	NTU	0619	WL	12/15/2003	N001	103.90 - 153.90	0.2	F	#	-	-	
	NTU	0655	WL	12/17/2003	N001	38.00 - 58.00	1.19	F	#	-	-	
	NTU	0656	WL	12/17/2003	N001	38.00 - 58.00	0.26	F	#	-	-	
	NTU	0662	WL	12/16/2003	N001	37.50 - 67.50	2.58	F	#	-	-	
	NTU	0669	WL	12/17/2003	N001	34.00 - 54.00	0.18	F	#	-	-	
	NTU	0760	WL	12/16/2003	N001	55.00 - 75.00	55.4	F	#	-	-	
	NTU	0761	WL	12/16/2003	N001	39.00 - 49.00	8.1	F	#	-	-	

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 1/30/2004 9:20 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE:		DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS:		DETECTION LIMIT	UN-CERTAINTY
				DATE	ID			LAB DATA	QA		
Turbidity	NTU	0762	WL	12/16/2003	N001	29.00 - 49.00	7.65	F	#	-	-
	NTU	0764	WL	12/16/2003	N001	47.00 - 52.00	6.06	FQ	#	-	-
	NTU	0765	WL	12/17/2003	N001	58.60 - 88.70	0.95	F	#	-	-
	NTU	0767	WL	12/17/2003	N001	43.50 - 63.50	5.55	F	#	-	-
	NTU	0768	WL	12/17/2003	N001	24.40 - 44.40	9.96	F	#	-	-
	NTU	0770	WL	12/17/2003	N001	54.90 - 64.90	1.42	F	#	-	-
	NTU	0771	WL	12/17/2003	N001	57.40 - 77.40	7.5	F	#	-	-
	NTU	0772	WL	12/16/2003	N001	7.40 - 27.40	2.43	F	#	-	-
	NTU	0774	WL	12/15/2003	N001	45.00 - 55.00	1.46	F	#	-	-
Uranium	mg/L	0604	WL	12/16/2003	0001	13.00 - 28.00	0.00250	F	#	0.0001	-
	mg/L	0606	WL	12/16/2003	0001	32.00 - 42.00	0.00870	F	#	0.0001	-
	mg/L	0619	WL	12/15/2003	0001	103.90 - 153.90	0.0590	F	#	0.0001	-
	mg/L	0619	WL	12/15/2003	0002	103.90 - 153.90	0.0590	F	#	0.0001	-
	mg/L	0655	WL	12/17/2003	0001	38.00 - 58.00	0.0148	F	#	0.0001	-
	mg/L	0656	WL	12/17/2003	0001	38.00 - 58.00	0.00600	F	#	0.0001	-
	mg/L	0662	WL	12/16/2003	0001	37.50 - 67.50	0.220	F	#	0.0001	-
	mg/L	0669	WL	12/17/2003	0001	34.00 - 54.00	0.00760	F	#	0.0001	-
	mg/L	0760	WL	12/16/2003	0001	55.00 - 75.00	0.00034 B	F	#	0.0001	-
	mg/L	0761	WL	12/16/2003	0001	39.00 - 49.00	0.0277	F	#	0.0001	-
	mg/L	0762	WL	12/16/2003	0001	29.00 - 49.00	0.01000	F	#	0.0001	-
	mg/L	0764	WL	12/16/2003	0001	47.00 - 52.00	0.0152	FQ	#	0.0001	-
	mg/L	0765	WL	12/17/2003	0001	58.60 - 88.70	0.0117	F	#	0.0001	-
	mg/L	0767	WL	12/17/2003	0001	43.50 - 63.50	0.00066 B	F	#	0.0001	-
	mg/L	0768	WL	12/17/2003	0001	24.40 - 44.40	0.00016 B	F	#	0.0001	-
	mg/L	0770	WL	12/17/2003	0001	54.90 - 64.90	0.00600	F	#	0.0001	-
	mg/L	0771	WL	12/17/2003	0001	57.40 - 77.40	0.0180	F	#	0.0001	-

GENERAL WATER QUALITY DATA BY PARAMETER (USEE205) FOR SITE MON01, MONUMENT VALLEY

REPORT DATE: 1/30/2004 9:20 am

PARAMETER	UNITS	LOCATION ID	LOC TYPE, SUBTYPE	SAMPLE: DATE	ID	DEPTH RANGE (FT BLS)	RESULT	QUALIFIERS: LAB DATA QA	DETECTION LIMIT	UN-CERTAINTY
Uranium	mg/L	0772	WL	12/16/2003	0001	7.40 - 27.40	0.00740	F #	0.0001	-
	mg/L	0774	WL	12/15/2003	0001	45.00 - 55.00	0.0611	F #	0.0001	-

RECORDS: SELECTED FROM USEE200 WHERE site\_code='MON01' AND quality\_assurance = TRUE AND (data\_validation\_qualifiers IS NULL OR data\_validation\_qualifiers NOT LIKE '%R%' AND data\_validation\_qualifiers NOT LIKE '%X%') AND DATE\_SAMPLED between #12/1/2003# and #12/30/2003#

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LOCATION TYPES: WL WELL

LOCATION SUBTYPES:

LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- > Result above upper detection limit.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- C Pesticide result confirmed by GC-MS.
- D Analyte determined in diluted sample.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- J Estimated
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.

DATA QUALIFIERS:

- F Low flow sampling method used.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- G Possible grout contamination, pH > 9.
- Q Qualitative result due to sampling technique
- X Location is undefined.
- J Estimated value.
- R Unusable result.

QA QUALIFIER: # = validated according to Quality Assurance guidelines.

BLANKS REPORT

LAB REQUISITION(S): 18800

REPORT DATE: 01/30/04 08:24:34: AM

PARAMETER	SITE CODE	LOCATION ID	SAMPLE DATE	ID	UNITS	RESULT	QUALIFIERS LAB DATA	DETECTION LIMIT	UNCERTAINTY	SAMPLE TYPE
Ammonia Total as NH4	MON01	0999	12/17/2003	0001	mg/L	0.0347	B F	0.0054		E
Nitrate as NO3	MON01	0999	12/17/2003	0001	mg/L	0.0191	U F	0.0191		E
Sulfate	MON01	0999	12/17/2003	0001	mg/L	0.0153	U F	0.0153		E
Uranium	MON01	0999	12/17/2003	0001	mg/L	0.0001	U F	0.0001		E

BLANKS REPORT

LAB REQUISITION(S): 18800

REPORT DATE: 01/30/04 08:24:35: AM

PARAMETER	SITE CODE	LOCATION ID	SAMPLE DATE	SAMPLE ID	UNITS	RESULT	QUALIFIERS LAB DATA	DETECTION LIMIT	UNCERTAINTY	SAMPLE TYPE
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SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

- \* Replicate analysis not within control limits.
- + Correlation coefficient for MSA < 0.995.
- A TIC is a suspected aldol-condensation product.
- B Inorganic: Result is between the IDL and CRDL. Organic: Analyte also found in method blank.
- E Inorganic: Estimate value because of interference, see case narrative. Organic: Analyte exceeded calibration range of the GC-MS.
- Z Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- H Holding time expired, value suspect.
- I Increased detection limit due to required dilution.
- C Pesticide result confirmed by GC-MS.
- M GFAA duplicate injection precision not met.
- N Inorganic or radiochemical: Spike sample recovery not within control limits. Organic: Tentatively identified compound (TIC).
- S Result determined by method of standard addition (MSA).
- U Analytical result below detection limit.
- W Post-digestion spike outside control limits while sample absorbance < 50% of analytical spike absorbance.
- D Analyte determined in diluted sample.
- P > 25% difference in detected pesticide or Arochlor concentrations between 2 columns.
- X Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- Y Laboratory defined (USEPA CLP organic) qualifier, see case narrative.
- > Result above upper detection limit.
- J Estimated

DATA QUALIFIERS:

- J Estimated value.
- L Less than 3 bore volumes purged prior to sampling.
- U Parameter analyzed for but was not detected.
- F Low flow sampling method used.
- R Unusable result.
- Q Qualitative result due to sampling technique
- G Possible grout contamination, pH > 9.
- X Location is undefined.

SAMPLE TYPES:

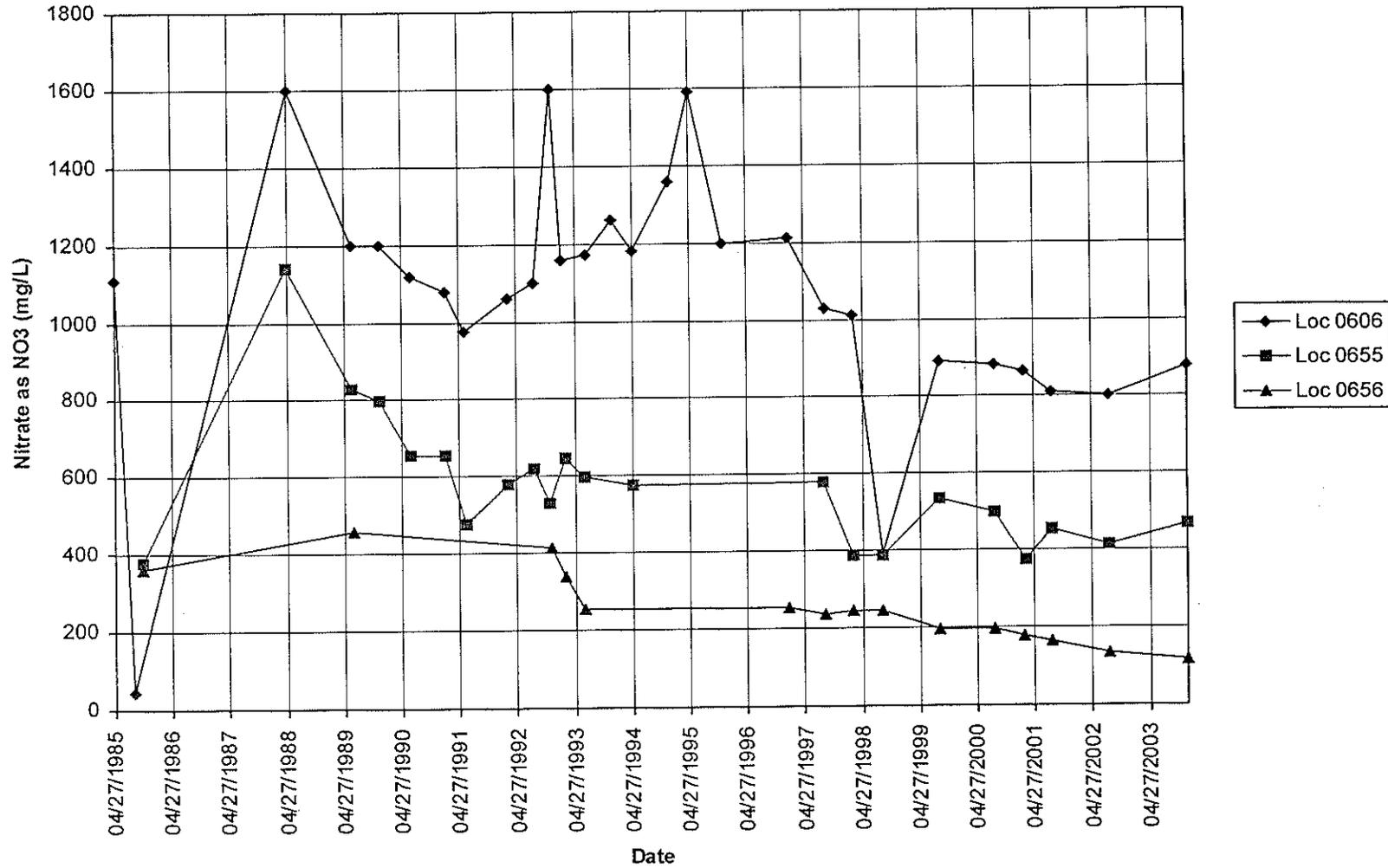
- AK ANALYTICAL KNOWN
- F FIELD SAMPLE
- K KNOWN
- R REPLICATE
- XB EXTRACTION BLANK
- D DUPLICATE
- FB FIELD BLANK
- L LABORATORY
- TB TRIP BLANK
- E EQUIPMENT BLANK
- FR FIELD SAMPLE WITH REPLICATES
- N NOT KNOWN
- TK THEORETICAL KNOWN

# **TIME VERSUS CONCENTRATION GRAPHS**

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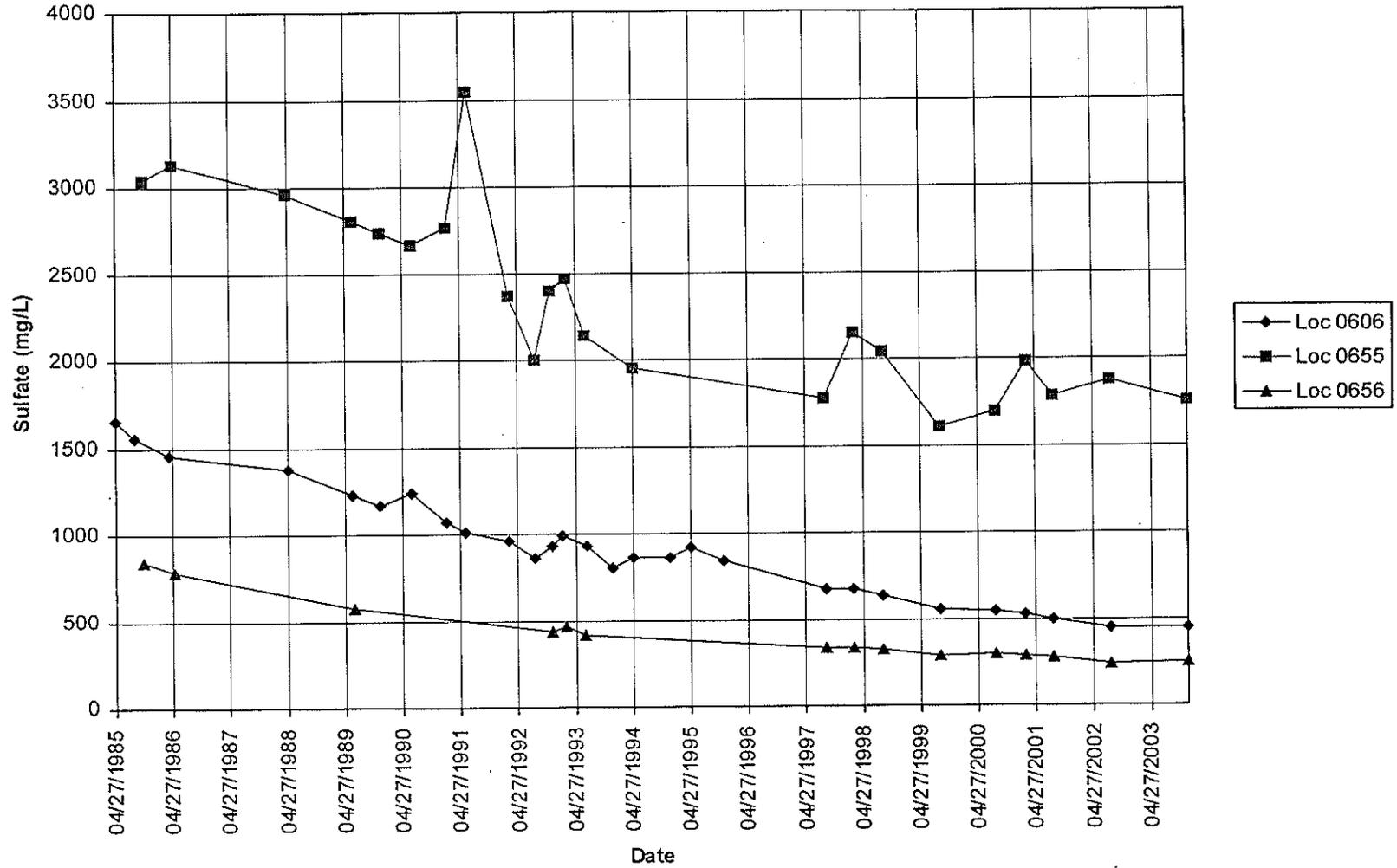
MONUMENT VALLEY (MON01)

Nitrate as NO3 Concentration



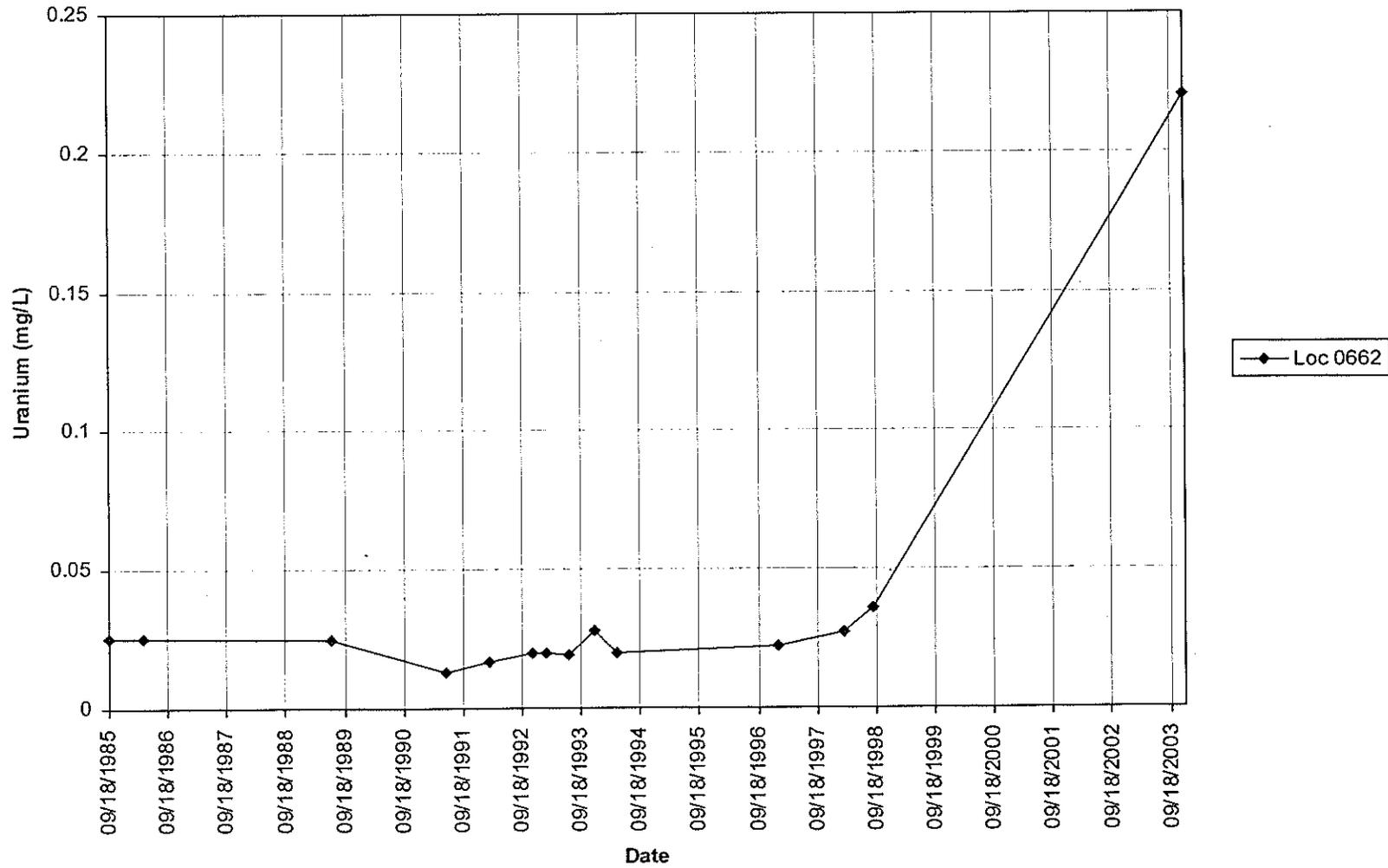
MONUMENT VALLEY (MON01)

Sulfate Concentration



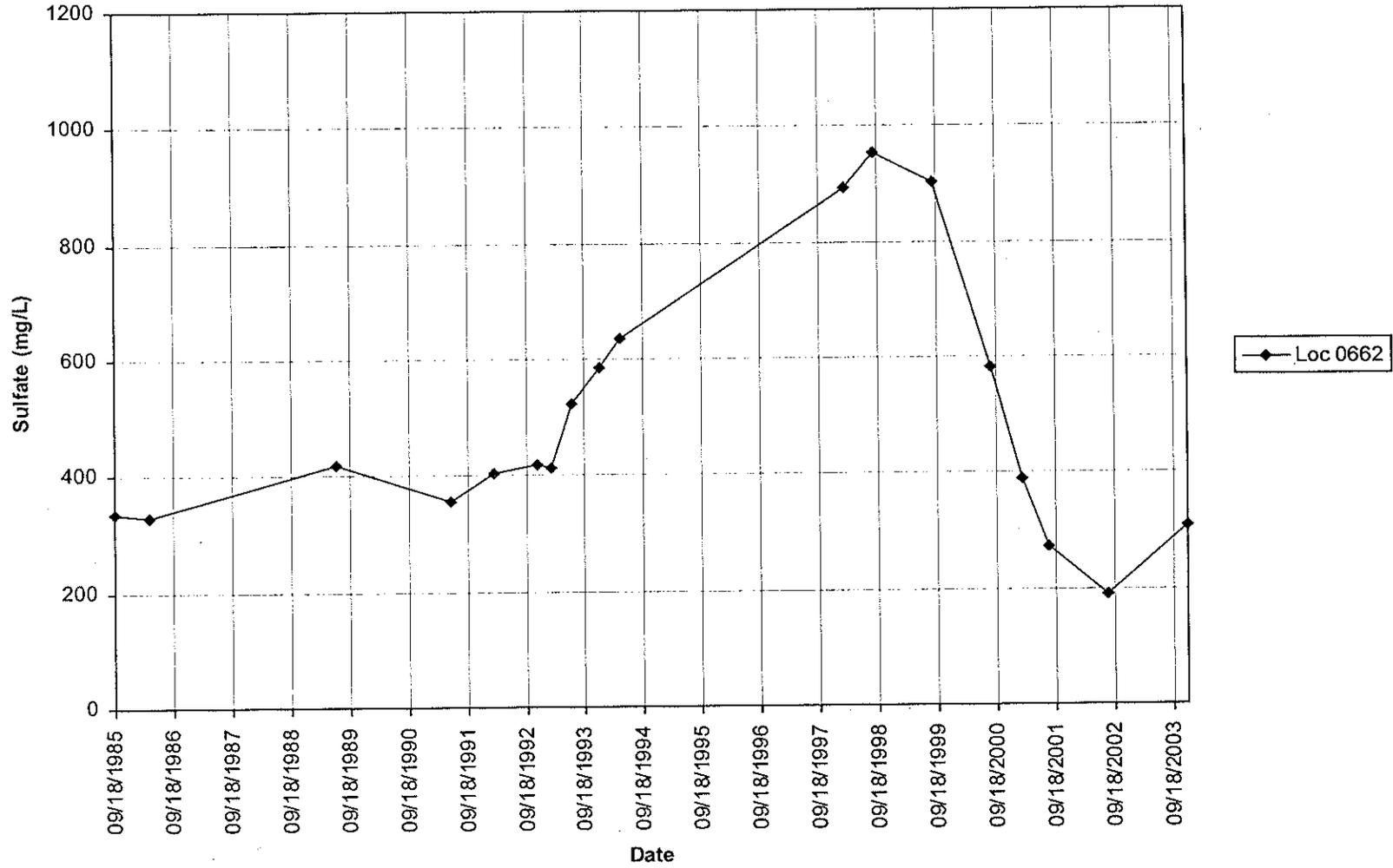
MONUMENT VALLEY (MON01)

Uranium Concentration



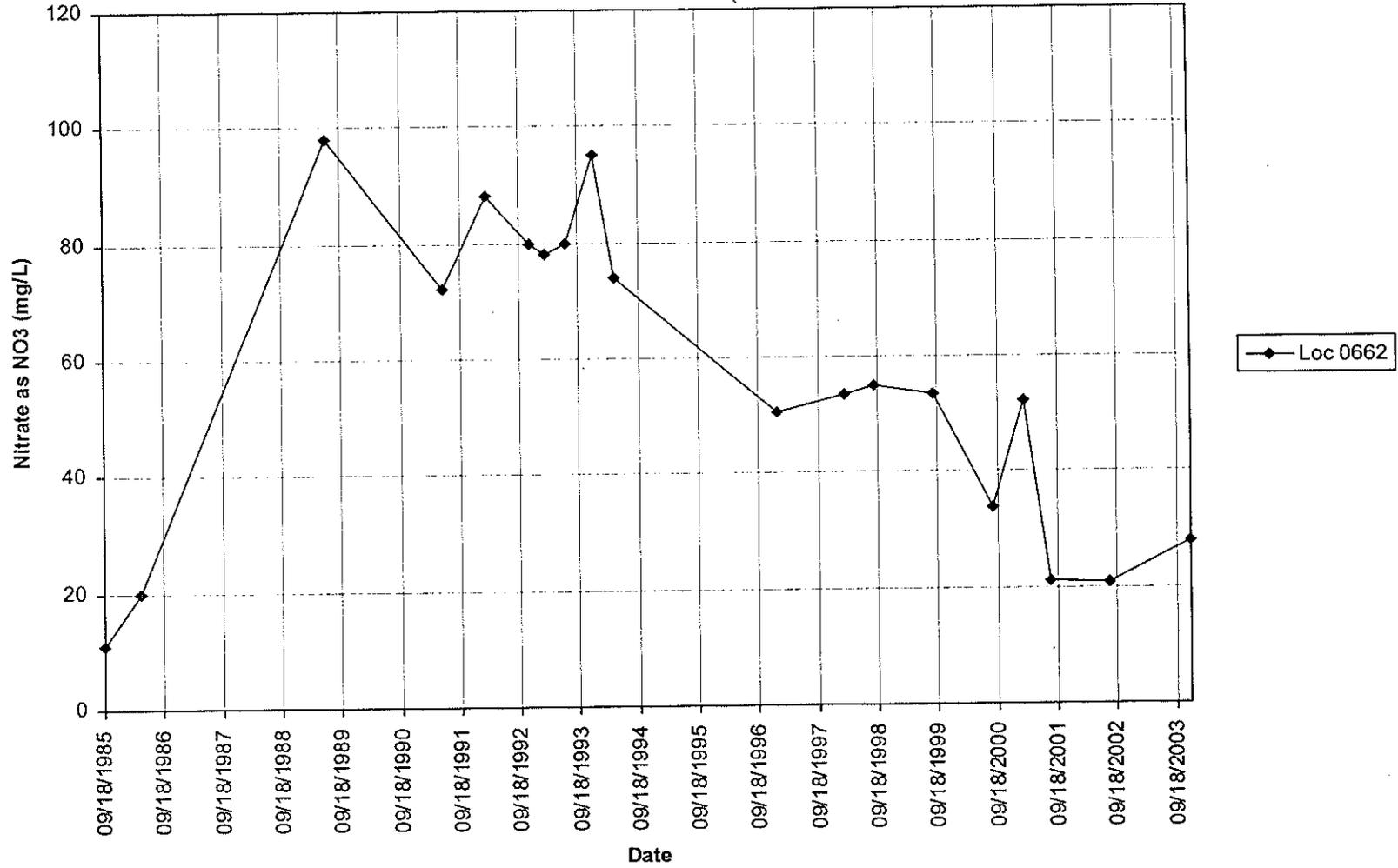
MONUMENT VALLEY (MON01)

Sulfate Concentration



MONUMENT VALLEY (MON01)

Nitrate as NO3 Concentration



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# **WATER LEVELS**

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STATIC WATER LEVELS (USEE700) FOR SITE MON01, MONUMENT VALLEY  
 REPORT DATE: 1/30/2004 9:52 am

LOCATION CODE	FLOW CODE	TOP OF CASING ELEVATION (FT)	MEASUREMENT		DEPTH FROM TOP OF CASING (FT)	WATER ELEVATION (FT)	WATER LEVEL FLAG
			DATE	TIME			
0604	C	4840.42	12/16/2003	09:23	8.83	4831.59	
0606	D	4864.73	12/16/2003	10:48	35.82	4828.91	
0619	O	4888.63	12/15/2003	15:50	56.91	4831.72	
0655	D	4862.06	12/17/2003	09:50	39.54	4822.52	
0656	D	4856.33	12/17/2003	15:35	36.32	4820.01	
0662	D	4878.56	12/16/2003	12:22	49.03	4829.53	
0669	D	4867.19	12/17/2003	10:44	19.62	4847.57	
0760	D	4814.80	12/16/2003	14:14	25.49	4789.31	
0761	D	4835.02	12/16/2003	13:14	43.08	4791.94	
0762	D	4820.74	12/16/2003	13:58	32.29	4788.45	
0764	D	4851.53	12/16/2003	16:00	49.70	4801.83	
0765	D	4848.45	12/17/2003	12:29	35.18	4813.27	
0767	D	4808.25	12/17/2003	14:00	6.79	4801.46	
0768	D	4820.73	12/17/2003	13:13	14.12	4806.61	
0770	D	4857.26	12/17/2003	14:56	32.86	4824.40	
0771	D	4863.26	12/17/2003	09:14	41.66	4821.60	
0772	O	4847.60	12/16/2003	10:03	11.94	4835.66	
0774	O	4880.14	12/15/2003	16:35	48.67	4831.47	

RECORDS: SELECTED FROM USEE700 WHERE site\_code='MON01' AND LOG\_DATE between #12/1/2003# and #12/30/2003#

FLOW CODES: C CROSS GRADIENT D DOWN GRADIENT O ON-SITE

WATER LEVEL FLAGS:

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**WORK ORDER  
AND  
TRIP REPORT**

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Task Order ST04-102  
Control Number 1000-T04-0387

December 4, 2003

Richard P. Bush  
Program Manager  
U.S. Department of Energy  
Grand Junction Office  
2597 B ¾ Road  
Grand Junction, CO 81503

SUBJECT: Contract No. DE-AC13-02GJ79491, Stoller  
December 2003 Environmental Sampling at Monument Valley, Arizona

Reference: FY 2004 LM Task Order No. ST04-102-M6

Dear Mr. Bush:

The purpose of this letter is to inform you of the upcoming sampling event at Monument Valley, Arizona. Enclosed are the map and tables specifying sample locations and analytes for routine monitoring. Water quality data will be collected from monitor wells at this site as part of the routine environmental sampling scheduled to begin the week of December 15, 2003.

The following list shows the monitor wells (with their zone of completion) scheduled to be sampled during this event.

**Monitor Wells (filtered)\***

604 Al	655 Al	669 Al	762 Al	767 Al	770 Al	772 Al
606 Al	656 Al	760 Al	764 Al	768 Al	771 Al	774 Al
619 Dc	662 Al	761 Al	765 Al			

\*NOTE: Al = Alluvium; Dc = Dechelley Member Of The Cutler Formation.

QA/QC samples will be collected as directed in the *Sampling and Analysis Plan for GJO Projects*. Access agreements are covered by the cooperative agreement.

If you have any questions, please call me at extension 6588 or Dave Traub at extension 6557.

Richard Bush  
1000-T04-0387  
Page 2

Sincerely,

Clay Carpenter  
Project Manager

CC/lcg/lad  
Enclosures (3)

cc: A. W. Kleinrath, DOE-GJO  
R. B. Chessmore, Stoller  
R. K. Johnson, Stoller  
D. E. Miller, Stoller  
D. G. Traub, Stoller  
Working File (Thru A. Temple)

cc w/o enclosures:  
K. E. Miller, Stoller  
Correspondence Control File (Thru V. Creagar)

*Memorandum*

Control Number N/A

DATE: December 26, 2003

TO: David E. Miller

FROM: David G. Traub

SUBJECT: Sampling Trip Report

Site: Monument Valley

**Dates of Sampling Event:** December 15 - 18, 2003.

**Team Members:** Dave Traub and Sam Campbell.

**Trip Summary:** Water samples were collected from 18 wells. Data loggers were downloaded from four wells. Chains and locks were secured around three gates at the phytoremediation area. Three keys for these locks were given to Mary Stanley and two keys will be given to Jody Waugh. These three locks are also linked to three UMTRA locks. The generator for the water supply well was replaced with the original one that had been serviced in Grand Junction.

**Locations Not Sampled / Reason:** None.

**Field Variance:** Turbidity could not be met on well 0760; this well needs redevelopment.

**Requisition Numbers Assigned:** Samples were turned in on Thursday afternoon, December 18. The samples were assigned requisition number 18800.

**Water Level Measurements:** Water level measurements were taken in all sampled wells.

**Well Inspection Summary:** Well inspections were conducted on all sampled wells. All wells were mainly in good condition. Several of the wells with concrete pads have had the sand below the pad blow away. Well 0656 was missing a lock. This was locked after sampling. Almost all locks at the site are full of fine sand.

**Quality Control Sample Cross Reference:** One ground water sample duplicate was collected for quality control. One equipment blank was collected using the peristaltic pump used for two wells. All samples were collected using dedicated bladder pumps except for the two wells with water shallow enough for the peristaltic.

The following table lists the identification numbers of the quality control samples.

Sample ID	False Loc.	True Loc.	Sample Type
NDT 612	603	619	Sample Duplicate
NDT 625	1000	--	Equipment blank

**Corrective Action:** None.

**Equipment:** Wells were sampled using the low flow purge procedure with dedicated bladder pumps in each well except for two wells with water levels shallow enough to use a peristaltic pump and dedicated tubing

**Location Specific Information:** Could not maintain the water level on well 0764 while purging. There was sand on the probe. This well needs redevelopment.

**Regulatory:** None

**Site Issues:** There are virtually no roads to the wells north and east of the main access road in the valley. All wells require all terrain vehicles (ATVs) to get to the wells. The primitive roads used to drill the wells have now been filled with windblown sand and weeds.

**Additional Action Required / Taken:** None.

**Next Sampling Trip:** No action required.

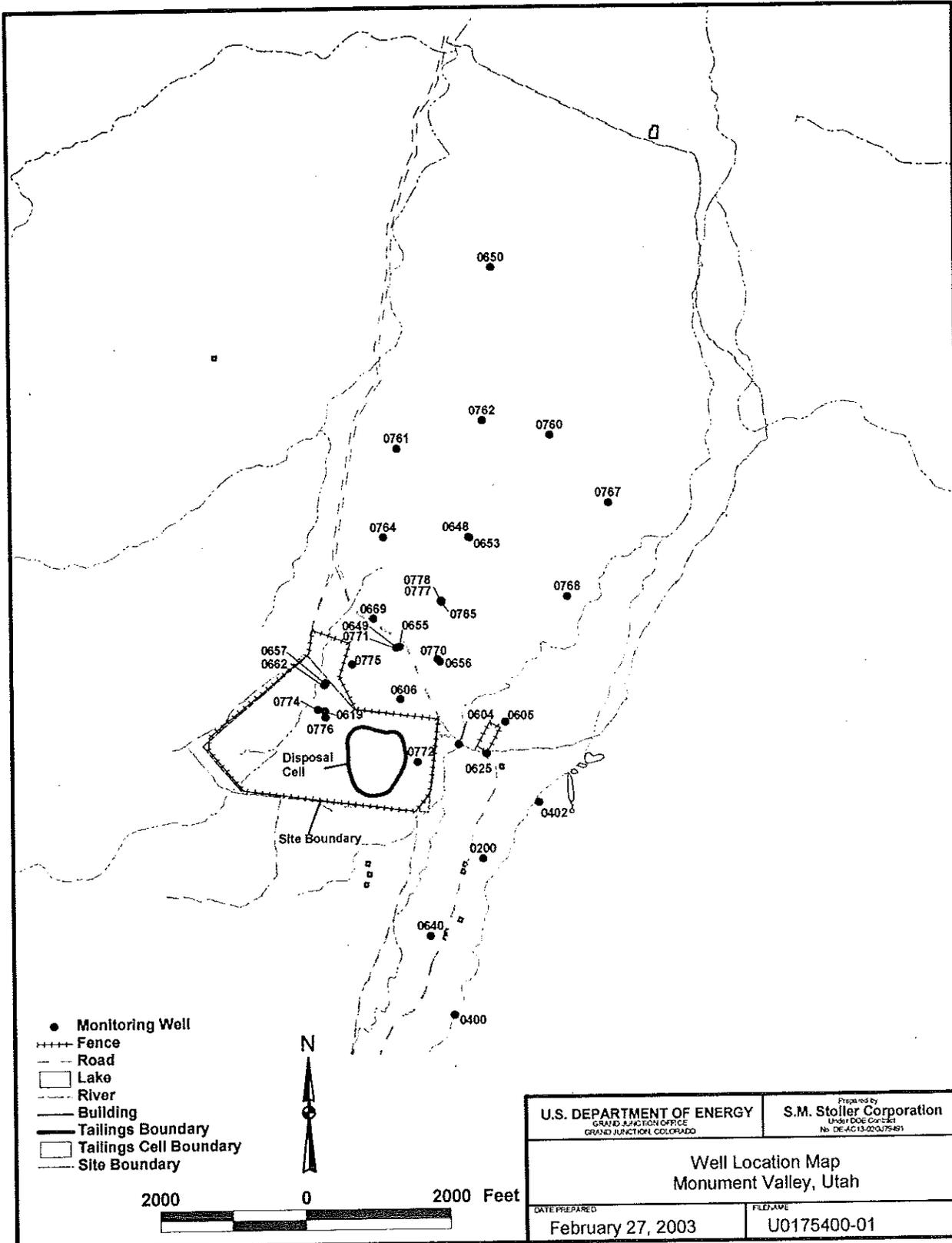
(DGT/lcg)

cc:

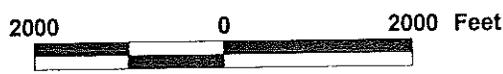
K. E. Miller, Stoller

**SAMPLING LOCATION  
MAP**

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- Monitoring Well
- ++++ Fence
- - - Road
- Lake
- ~ ~ ~ River
- Building
- Tailings Boundary
- Tailings Cell Boundary
- Site Boundary



U.S. DEPARTMENT OF ENERGY GRAND JUNCTION OFFICE GRAND JUNCTION, COLORADO	Prepared by <b>S.M. Stoller Corporation</b> UNSW/DOE CONTRACT No. DE-AC13-02OU75481
Well Location Map Monument Valley, Utah	
DATE PREPARED February 27, 2003	FILE NAME U0175400-01

m:\ugw\511\c019\42\c01754\U0175400 apr d50849 2/27/2003, 12:09

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